



SEQUENCE LISTING

<110> Dlawer, Ala' Aldeen  
Todd, Ian

<120> SCREENING FOR NEISSERIAL VACCINE CANDIDATES AND VACCINES AGAINST  
PATHOGENIC NEISSERIA

<130> 15-840

<140> US 09/743,674

<141> 2001-01-10

<150> PCT/GB99/02205

<151> 1999-07-09

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<170> PatentIn version 3.1

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Tyr Ile Leu Lys Asn Asn Arg Gln Ile Lys Leu Ile Ala Ala Ser Val

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Ile Gln Ser Asn Leu Asp Glu Pro Phe Ser Gly Ser Ile Thr Val Thr  
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85 90 95

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Glu Lys Gly Leu Thr Ala Lys Val His Lys Leu Gly Asp Lys Ala Val  
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Arg Ile Gly Ala Gly Ala Gln Val Arg Glu Tyr Thr Ala Ile Leu Asp  
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Thr His Arg Lys Thr Ala Pro Thr Ala Glu Ser Gln Glu Asn Gln Asn  
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Ala Lys Ala Leu Arg Lys Thr Asp Lys Lys Asp Ser Ala Asn Ala Ala  
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Val Lys Pro Ala Tyr Asn Gly Lys Thr His Thr Val Arg Lys Gly Glu  
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cac ggc aga ctg cgt gcg ggc agc gtg ctt cac att ccg aat ctg aac 886  
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260 265 270

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gcg gaa aaa ccg gcc gtt cga ccc gaa cct gta ccc gct gca aat act 1078  
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325 330 335

tct gcc atc gac acg ccg acc gac gaa acc ggt aac gcc gtt tcc gaa 1174  
Ser Ala Ile Asp Thr Pro Thr Asp Glu Thr Gly Asn Ala Val Ser Glu  
340 345 350

cct gtc gaa cag gtt tct gcc gaa gaa gaa acc gaa agc gga ctg ttc 1222  
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ccc gaa ccc gct ccg aaa aac gat gta aac gac aca ctt gcc tta gat 1462  
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acc caa aaa cgc gcg gat gcc gat tgg aac gcc atc gaa tcc aca gac 1654  
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Lys Pro Glu Thr Val Asp Thr Asp Phe Ser Asp Asn Leu Pro Ser Asn  
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tcc gga ctg gca ggc ttc ctg aag gct tcc tcg ccc gaa acc atc ttg 1894  
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645 650 655

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675 680 685

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Asp Asp Leu Ser Ala Leu Leu Gln Pro Ala Glu Ala Pro Ala Val Glu  
690 695 700

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740 745 750

acc gca gac gat ttg tcc gca tta ctt caa cct tct gaa gta ccg gcc 2422  
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755 760 765

gtt gag gaa aat gca gcg gaa atc act ttg gaa acg cct gat tcc aac 2470  
Val Glu Glu Asn Ala Ala Glu Ile Thr Leu Glu Thr Pro Asp Ser Asn  
770 775 780

acc tct gag gca gac gct ttg ccc gac ttc ctg aaa gac ggc gag gag 2518  
Thr Ser Glu Ala Asp Ala Leu Pro Asp Phe Leu Lys Asp Gly Glu Glu  
785 790 795 800

gaa acg gta gat tgg agc atc tac ctc tcg gaa gaa aat atc cca aat 2566  
Glu Thr Val Asp Trp Ser Ile Tyr Leu Ser Glu Glu Asn Ile Pro Asn  
805 810 815

aat gca gat acc agt ttc cct tcg gaa tct gta ggt tct gac gcg cct 2614  
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820 825 830

tcc gaa gcg aaa tac gac ctt gcc gaa atg tat ctc gaa atc ggc gac 2662  
Ser Glu Ala Lys Tyr Asp Leu Ala Glu Met Tyr Leu Glu Ile Gly Asp  
835 840 845

cgc gat gcc gct gcc gag aca gtg cag aaa ttg ctg gaa gaa gcg gaa 2710  
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850 855 860

ggc gac gta ctc aaa cgt gcc caa gca ttg gcg cag gaa ttg ggt att 2758  
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35 40 45

Ala Val Ala Ala Ser Phe Gln Ala His Ala Gly Leu Gly Gly Leu Asn  
50 55 60

Ile Gln Ser Asn Leu Asp Glu Pro Phe Ser Gly Ser Ile Thr Val Thr  
65 70 75 80

Gly Glu Glu Ala Lys Ala Leu Leu Gly Gly Gly Ser Val Thr Val Ser  
85 90 95

Glu Lys Gly Leu Thr Ala Lys Val His Lys Leu Gly Asp Lys Ala Val  
100 105 110

Ile Ala Val Ser Ser Glu Gln Ala Val Arg Asp Pro Val Leu Val Phe  
115 120 125

Arg Ile Gly Ala Gly Ala Gln Val Arg Glu Tyr Thr Ala Ile Leu Asp  
130 135 140

Pro Val Gly Tyr Ser Pro Lys Thr Lys Ser Ala Leu Ser Asp Gly Lys  
145 150 155 160

Thr His Arg Lys Thr Ala Pro Thr Ala Glu Ser Gln Glu Asn Gln Asn  
165 170 175

Ala Lys Ala Leu Arg Lys Thr Asp Lys Lys Asp Ser Ala Asn Ala Ala  
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Val Lys Pro Ala Tyr Asn Gly Lys Thr His Thr Val Arg Lys Gly Glu  
195 200 205

Thr Val Lys Gln Ile Ala Ala Ala Ile Arg Pro Lys His Leu Thr Leu  
210 215 220

Glu Gln Val Ala Asp Ala Leu Leu Lys Ala Asn Pro Asn Val Ser Ala

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His Gly Arg Leu Arg Ala Gly Ser Val Leu His Ile Pro Asn Leu Asn			
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Arg Ile Lys Ala Glu Gln Pro Lys Pro Gln Thr Ala Lys Pro Lys Ala			
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Glu Thr Ala Ser Met Pro Ser Glu Pro Ser Lys Gln Ala Thr Val Glu			
	275	280	285
Lys Pro Val Glu Lys Pro Glu Ala Lys Val Ala Ala Pro Glu Ala Lys			
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Ala Glu Lys Pro Ala Val Arg Pro Glu Pro Val Pro Ala Ala Asn Thr			
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Ala Ala Ser Glu Thr Ala Ala Glu Ser Ala Pro Gln Glu Ala Ala Ala			
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Ser Ala Ile Asp Thr Pro Thr Asp Glu Thr Gly Asn Ala Val Ser Glu			
	340	345	350
Pro Val Glu Gln Val Ser Ala Glu Glu Glu Thr Glu Ser Gly Leu Phe			
	355	360	365
Gly Gly Ser Tyr Thr Leu Leu Leu Ala Gly Gly Gly Ala Ala Leu Ile			
	370	375	380
Ala Leu Leu Leu Leu Leu Arg Leu Ala Gln Ser Lys Arg Ala Arg Arg			
385	390	395	400
Thr Glu Glu Ser Val Pro Glu Glu Glu Pro Asp Leu Asp Asp Ala Ala			
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420 425 430

Pro Glu Pro Ala Pro Lys Asn Asp Val Asn Asp Thr Leu Ala Leu Asp  
435 440 445

Gly Glu Ser Glu Glu Glu Leu Ser Ala Lys Gln Thr Phe Asp Val Glu  
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465 470 475 480

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485 490 495

Thr Gln Lys Arg Ala Asp Ala Asp Trp Asn Ala Ile Glu Ser Thr Asp  
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Val Ile Asp Thr Pro Glu Pro Glu Ser Val Ala Gln Thr Ala Glu Asn  
530 535 540

Lys Pro Glu Thr Val Asp Thr Asp Phe Ser Asp Asn Leu Pro Ser Asn  
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Asn His Ile Gly Thr Glu Glu Thr Ala Ser Ala Lys Pro Ala Ser Pro  
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580 585 590

Glu Lys Thr Val Ala Glu Val Gln Thr Pro Glu Glu Leu His Asp Phe

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Leu Lys Val Tyr Glu Thr Asp Ala Val Ala Glu Thr Ala Pro Glu Thr  
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645            650            655

Thr Pro Asp Phe Asn Ala Thr Ala Asp Asp Leu Ser Ala Leu Leu Gln  
660            665            670

Pro Ser Glu Val Pro Ala Val Glu Glu Asn Ala Ala Glu Ile Val Ala  
675            680            685

Asp Asp Leu Ser Ala Leu Leu Gln Pro Ala Glu Ala Pro Ala Val Glu  
690            695            700

Glu Asn Val Thr Glu Thr Val Ala Glu Thr Ser Asp Phe His Thr Ala  
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Ala Asp Asp Leu Ser Ala Leu Leu Gln Pro Ala Glu Val Pro Ala Val  
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Glu Glu Asn Val Thr Lys Thr Val Ala Glu Ile Pro Asp Phe Asn Ala  
740            745            750

Thr Ala Asp Asp Leu Ser Ala Leu Leu Gln Pro Ser Glu Val Pro Ala  
755            760            765

Val Glu Glu Asn Ala Ala Glu Ile Thr Leu Glu Thr Pro Asp Ser Asn  
770            775            780

Thr Ser Glu Ala Asp Ala Leu Pro Asp Phe Leu Lys Asp Gly Glu Glu  
785                790                795                800

Glu Thr Val Asp Trp Ser Ile Tyr Leu Ser Glu Glu Asn Ile Pro Asn  
805                810                815

Asn Ala Asp Thr Ser Phe Pro Ser Glu Ser Val Gly Ser Asp Ala Pro  
820                825                830

Ser Glu Ala Lys Tyr Asp Leu Ala Glu Met Tyr Leu Glu Ile Gly Asp  
835                840                845

Arg Asp Ala Ala Ala Glu Thr Val Gln Lys Leu Leu Glu Glu Ala Glu  
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1                5                10                15

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Ile Ile Leu Cys Phe Ser Phe Phe Val Pro Lys Phe Ala Leu Ala Ser  
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Val Asn Val Pro Gly Lys Phe Asp Arg Val Glu Val Tyr Asp Asp Gly

35            40            45  
aga tat tta ggt att cga ggt tca gat gac aaa aga aga att tgg    192  
Arg Tyr Leu Gly Ile Arg Gly Ser Asp Asp Lys Arg Arg Arg Ile Trp  
50            55            60  
aaa ggt gta ttt gat aga gaa tcg gga aga tat tta act tca gaa gct    240  
Lys Gly Val Phe Asp Arg Glu Ser Gly Arg Tyr Leu Thr Ser Glu Ala  
65            70            75            80  
caa gat tta aaa gtt agg cat gta tct act gga gca tca agt acg ggt    288  
Gln Asp Leu Lys Val Arg His Val Ser Thr Gly Ala Ser Ser Thr Gly  
85            90            95  
aaa gtt agt tcg gtt gta tct tca tca gtt tcc cgc gcc gga gtc ttg    336  
Lys Val Ser Ser Val Val Ser Ser Ser Val Ser Arg Ala Gly Val Leu  
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gca gga gtc ggc aaa ctt gcc cgc tta ggc gcg aaa tta agc aca agg    384  
Ala Gly Val Gly Lys Leu Ala Arg Leu Gly Ala Lys Leu Ser Thr Arg  
115            120            125  
gca gtt cct tat gtc gga aca gcc ctt tta gcc cat gac gta tac gaa    432  
Ala Val Pro Tyr Val Gly Thr Ala Leu Leu Ala His Asp Val Tyr Glu  
130            135            140  
act ttc aaa gaa gac ata cag gca caa ggc tac caa tac gac ccc gaa    480  
Thr Phe Lys Glu Asp Ile Gln Ala Gln Gly Tyr Gln Tyr Asp Pro Glu  
145            150            155            160  
acc gac aaa ttt gta aaa ggc tac gaa tat agt aat tgc ctt tgg tac    528  
Thr Asp Lys Phe Val Lys Gly Tyr Glu Tyr Ser Asn Cys Leu Trp Tyr  
165            170            175  
gaa gac aaa aga cgt att aat aga acc tat ggc tgc tac ggc gtt gac    576  
Glu Asp Lys Arg Arg Ile Asn Arg Thr Tyr Gly Cys Tyr Gly Val Asp  
180            185            190  
agt tcg att atg cgc ctt atg tcc gat gac agc aga ttc ccc gaa gtc    624  
Ser Ser Ile Met Arg Leu Met Ser Asp Asp Ser Arg Phe Pro Glu Val  
195            200            205  
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Lys Glu Leu Met Glu Ser Gln Met Tyr Arg Leu Ala Arg Pro Phe Trp  
210            215            220

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225 230 235 240

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Asn Phe Val Leu Asn Ser Cys Thr Phe Asp Trp Asn Gly Gly Asp Cys  
245 250 255

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260 265 270

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Ile Arg Asn Ser Lys Tyr Lys Glu Met Asp Ala Lys Lys Leu Glu  
275 280 285

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325 330 335

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340 345 350

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355 360 365

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385 390 395 400

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 Gln Pro Gly Thr Arg Pro Asp Ser Pro Ala Val Pro Gly Arg Thr Asn  
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435 440 445

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aat ccg gca gaa gat tta aat ctg ccg tct gaa acc gtc aat gta gag 1440  
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465 470 475 480

ttt cag aaa tca gga atc ttt caa gat tcc gca cag tgt ccc gca cct 1488  
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485 490 495

gtc act ttc aca gtg act gtg ctt gat tca agc agg cag ttc gcg ttc 1536  
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Val Asn Val Pro Gly Lys Phe Asp Arg Val Glu Val Tyr Asp Asp Gly  
35 40 45

Arg Tyr Leu Gly Ile Arg Gly Ser Asp Asp Lys Arg Arg Arg Ile Trp  
50 55 60

Lys Gly Val Phe Asp Arg Glu Ser Gly Arg Tyr Leu Thr Ser Glu Ala  
65 70 75 80

Gln Asp Leu Lys Val Arg His Val Ser Thr Gly Ala Ser Ser Thr Gly  
85 90 95

Lys Val Ser Ser Val Val Ser Ser Ser Val Ser Arg Ala Gly Val Leu  
100 105 110

Ala Gly Val Gly Lys Leu Ala Arg Leu Gly Ala Lys Leu Ser Thr Arg  
115 120 125

Ala Val Pro Tyr Val Gly Thr Ala Leu Leu Ala His Asp Val Tyr Glu  
130 135 140

Thr Phe Lys Glu Asp Ile Gln Ala Gln Gly Tyr Gln Tyr Asp Pro Glu  
145 150 155 160

Thr Asp Lys Phe Val Lys Gly Tyr Glu Tyr Ser Asn Cys Leu Trp Tyr  
165 170 175

Glu Asp Lys Arg Arg Ile Asn Arg Thr Tyr Gly Cys Tyr Gly Val Asp  
180 185 190

Ser Ser Ile Met Arg Leu Met Ser Asp Asp Ser Arg Phe Pro Glu Val  
195 200 205

Lys Glu Leu Met Glu Ser Gln Met Tyr Arg Leu Ala Arg Pro Phe Trp  
210 215 220

Asn Trp His Lys Glu Glu Leu Asn Lys Leu Ser Ser Leu Asp Trp Asn  
225 230 235 240

Asn Phe Val Leu Asn Ser Cys Thr Phe Asp Trp Asn Gly Gly Asp Cys  
245 250 255

Val Val Asn Lys Gly Asp Asp Phe Arg Asn Gly Ala Asp Phe Ser Leu  
260 265 270

Ile Arg Asn Ser Lys Tyr Lys Glu Glu Met Asp Ala Lys Lys Leu Glu  
275 280 285

Glu Ile Leu Ser Leu Lys Val Asp Ala Asn Pro Asp Lys Tyr Ile Lys  
290 295 300

Ala Thr Gly Tyr Pro Gly Tyr Ser Glu Lys Val Glu Val Ala Pro Gly  
305 310 315 320

Thr Lys Val Asn Met Gly Pro Val Thr Asp Arg Asn Gly Asn Pro Val  
325 330 335

Gln Val Val Ala Thr Phe Gly Arg Asp Ser Gln Gly Asn Thr Thr Val  
340 345 350

Asp Val Gln Val Ile Pro Arg Pro Asp Leu Thr Pro Gly Ser Ala Glu  
355 360 365



Ala Pro Asn Ala Gln Pro Leu Pro Glu Val Ser Pro Ala Glu Asn Pro  
370 375 380

Ala Asn Asn Pro Asn Pro Asn Glu Asn Pro Gly Thr Ser Pro Asn Pro  
385 390 395 400

Glu Pro Asp Pro Asp Leu Asn Pro Asp Ala Asn Pro Asp Thr Asp Gly  
405 410 415

Gln Pro Gly Thr Arg Pro Asp Ser Pro Ala Val Pro Gly Arg Thr Asn  
420 425 430

Gly Arg Asp Gly Lys Asp Gly Lys Asp Gly Lys Asp Gly Gly Leu Leu  
435 440 445

Cys Lys Phe Phe Pro Asp Ile Leu Ala Cys Asp Arg Leu Pro Glu Ser  
450 455 460

Asn Pro Ala Glu Asp Leu Asn Leu Pro Ser Glu Thr Val Asn Val Glu  
465 470 475 480

Phe Gln Lys Ser Gly Ile Phe Gln Asp Ser Ala Gln Cys Pro Ala Pro  
485 490 495

Val Thr Phe Thr Val Thr Val Leu Asp Ser Ser Arg Gln Phe Ala Phe  
500 505 510

Ser Phe Glu Asn Ala Cys Thr Ile Ala Glu Arg Leu Arg Tyr Met Leu  
515 520 525

Leu Ala Leu Ala Trp Ala Val Ala Ala Phe Phe Cys Ile Arg Thr Val  
530 535 540

Ser Arg Glu Val  
545